Median Barriers

Source: FHWA

In the time it takes for the driver to yawn, a vehicle traveling at highway speeds can cross a highway median and strike opposing traffic head-on. Head-on crashes at highway speed are generally more severe than other types of highway crashes. In 2006, on the National Highway System alone, there were 821 median crossover crashes that resulted in fatalities.

Median barriers are longitudinal barriers most commonly used to separate opposing directions of traffic on a divided highway. While these systems may not reduce the frequency of crashes due to roadway departure, they can definitely help prevent a median crash from becoming a median crossover head-on collision.

Barrier Design and Placement Considerations

Barrier design and placement needs to effectively protect motorists traveling in opposing lanes, while also considering the safety of the occupants of the errant vehicle. Among the factors involved in selection of a barrier system are the types of vehicles using the roadway, the roadway geometry, and the potential severity of a median crossover crash. Standard barriers capable of redirecting passenger cars, light vans and trucks are considered cost effective for most situations. However, at locations with adverse geometrics, high traffic volumes and speeds, significant amounts of heavy truck traffic, or special environmental considerations, a higher performance median barrier may be more appropriate.

Pros and Cons of Barrier System Options

There are three basic categories of median barriers: rigid barrier systems, semi-rigid barrier systems, and flexible barrier systems.

- ***Rigid Barriers:*** Concrete barriers are the most common type of rigid median barrier in use today. While the initial cost of installation can be relatively high, concrete barriers are known for their relatively low life-cycle cost, effective safety performance, and their relatively maintenance-free characteristics. One drawback is that crashes associated with rigid barriers may result in more severe injuries because, relative to other barrier systems, a rigid system absorbs the least energy in a crash. Nevertheless, concrete barriers have proven to be very effective at mitigating median crossover collisions, especially in locations with high traffic volumes and high speeds. These barrier systems have proven to be

highly effective in locations with high traffic volumes and high speeds. Concrete barrier systems are also very effective in places with heavy truck traffic, and in areas where sufficient median widths to accommodate other barrier systems are not available.

- ***Semi-Rigid Barriers***: Commonly referred to as guardrail or guiderail, semi-rigid barriers typically consist of connected segments of metal railing supported by posts and blocks. The semi-rigid barrier system is most suitable for use in traversable medians having no or little change in grade and cross slope. In comparison to rigid barriers, semi-rigid barriers can be less costly, but can be more difficult to install in locations with slope and poor soil conditions. Additionally, the need for repair following impact can drive up life-cycle cost. Guardrail systems are designed to absorb energy during a crash, and the entire assembly is designed to move or deflect during an impact.

- ***Cable Barriers***: A typical cable barrier consists of multiple steel cables that are connected to a series of posts. These systems are considered the most versatile and forgiving barrier systems available for reducing the severity of median crossover crashes. Cable median barriers minimize the forces on the vehicle and its occupants and absorb most of the energy of a crash. In comparison to rigid and semi-rigid barriers systems, cable barrier systems generally have a lower installation cost. Like guardrails, however, they typically require maintenance after a crash, and therefore can have a higher life cycle cost.

Source: FHWA

Ease of maintenance and repair for these barrier systems is an important consideration. When several posts are hit during a single crash, the barrier system may then be vulnerable to subsequent crossovers until the damaged section is repaired. Some high tension systems are designed to reduce deflection and resist impact forces. These high tension systems can be easier to repair when posts are hit, and have the added advantage of being practical for use in narrower spaces.

For More Information

AASHTO-AGC-ARTBA *Online Barrier Hardware Guide*: **http://aashtotf13.tamu.edu/**
AASHTO's *Technology Implementation Group Cable Median Barriers Website*:
http://tig.transportation.org/?siteid=57&pageid=2197
Charles F. McDevitt: "Basics of Concrete Barriers," Public Roads, Vol. 63 No. 5, March/April 2000:
http://fhwicsint01.fhwa.dot.gov/publications/publicroads/00marapr/concrete.cfm
FHWA Crash Test Acceptance Letters for Longitudinal Barriers:
http://safety.fhwa.dot.gov/roadway_dept/policy_guide/road_hardware/barriers/
Frequently Asked Questions: Barriers, Terminals, Transitions, Attenuators, and Bridge Railings:
http://safety.fhwa.dot.gov/roadway_dept/policy_guide/road_hardware/qa_bttabr.cfm
Roadside Design Guide, AASHTO, 2006: **https://bookstore.transportation.org/Item_details.aspx?id=148**
Median Barriers: A Solution to Cross-Median Crashes, DVD, FHWA-SA-08-007.

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